

NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION

Reuse Working Group

Co-chairs:

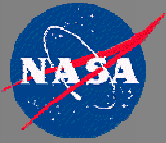
Robert Wolfe, NASA GSFC

Vic Delnore, NASA LRC

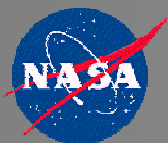
5th Earth Science Data Systems Working Group Meeting

College Park, MD

November 14 - 16, 2006

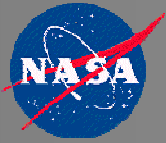


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- Working Group Members
 - Activities and Accomplishments
 - Summary of Activities
 - Recommendations to Headquarters
 - Reuse Portal Web Site
 - Trade Study
 - Bottom-up Reuse
 - Breakout Session Agenda



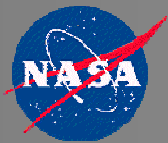
Members 2006 / Mailing List

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- Nadine Alameh (NASA/GSFC MobiLaps)
 - Angelo Bertolli (NASA/GSFC Innovim)
 - Howard Burrows (AUSI/NSDL)
 - Nancy Casey (NASA/GSFC SSAI)
 - Bradford Castalia (University of Arizona)
 - Victor Delnore (NASA/LARC)
 - Robert Downs (Columbia University)
 - Yonsook Enloe (NASA/GSFC SGT Inc.)
 - Stephan Falke (Washington University in St. Louis)
 - Mike Folk (National Center for Supercomputing Applications)
 - Ryan Gerard (NASA/GSFC Innovim)
 - Emily Greene (NASA/JPL Raytheon)
 - Mary Hunter (NASA/GSFC Innovim)
 - Tommy Jasmin (University of Wisconsin, Space Science Engineering Center)
 - James Marshall (NASA/GSFC Innovim)
 - Steve Olding (NASA/GSFC Everware)
 - Shahin Samadi (NASA/GSFC Innovim)
 - Mark Sherman (NASA/GSFC SGT Inc.)
 - Ross Swick (NSIDC – Boulder)
 - Bill Teng (NASA/GSFC SSAI)
 - Frederick Watson (California State University, Monterey Bay)
 - Robert Wolfe (NASA/GSFC)

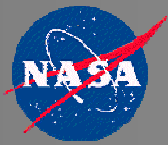


Major Accomplishments

- Software Reuse Enablement System (RES)
 - Completed trade study
 - Presented trade study and recommendations to NASA HQ
 - Formalized requirements
 - Formalized use cases
 - Started background work for architecture study
 - Examining candidate systems
 - Creating prototype sites
 - Evaluation results will determine recommendation
- Software Reuse Portal Web Site
 - Templates that meet NASA Affinity standards reused to create SPG and Technology Infusion web sites
 - Added FAQ and links to TRL information (including TRL calculator)
 - Implemented site statistics using NetTracker (from Metrics WG)
- Began discussion of bottom-up reuse
- Continued weekly support team telecons and monthly WG telecons
- Participated in joint WG telecons

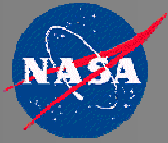


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- *Reuse Enablement System*: submitted trade study, received verbal response from HQ, awaiting additional feedback and approval
 - *Reuse portal*: provided more content and kept up to date; promoted portal to community
 - *Metrics/measurement*: generated/analyzed statistics for portal web site activity
 - *Promote reuse*: continued publishing and presenting work (including survey results), will hold special session at AGU fall meeting



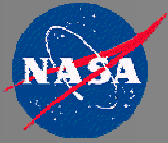
Publications and Conferences

- 2 posters and 2 breakout talks at 4th ESDS WG Meeting
- 2 abstracts published from 2005 Fall AGU Meeting
- 2 papers published in IGARSS 2006 proceedings
- Software Reuse Special Session at 2006 Fall AGU Meeting
 - Special Session has 6 posters
 - 1 abstract accepted
- 1 paper accepted for 2007 IEEE Aerospace Conference
- Attended many conferences and meetings including:
 - National Forum for Geoscience Information Technology
 - 16th and 17th ESIP Federation Meetings
 - V. Delnore distributed Software Reuse Portal Web Site handouts at 17th meeting
 - Navy Open Architecture Workshop
 - 2006 Fedora Users Conference
 - R. Downs presented poster “Meeting Challenges for Creating a Long-Term Archive for Socioeconomic Data: A Case Study”
 - 2006 Earth Science Technology Conference

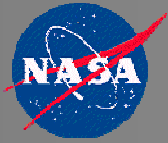


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Recommendations to Headquarters

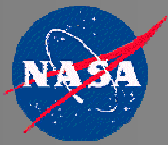


- General Recommendations
 - Policy should include language encouraging reuse.
 - Accepted and being implemented by HQ.
- Enabling Systems Recommendations
 - NASA should establish a web-based system to facilitate cataloging and a web-based repository system for distributing reusable assets for the Earth science community.
 - Trade study completed and submitted to HQ; awaiting approval.
 - NASA should establish a web-based information portal for the sharing and dissemination of information about software reuse practices for the Earth science community.
 - Software Reuse portal web site has been established; actively updated and maintained.



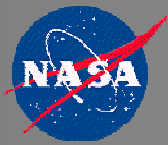
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Software Reuse Portal Web Site



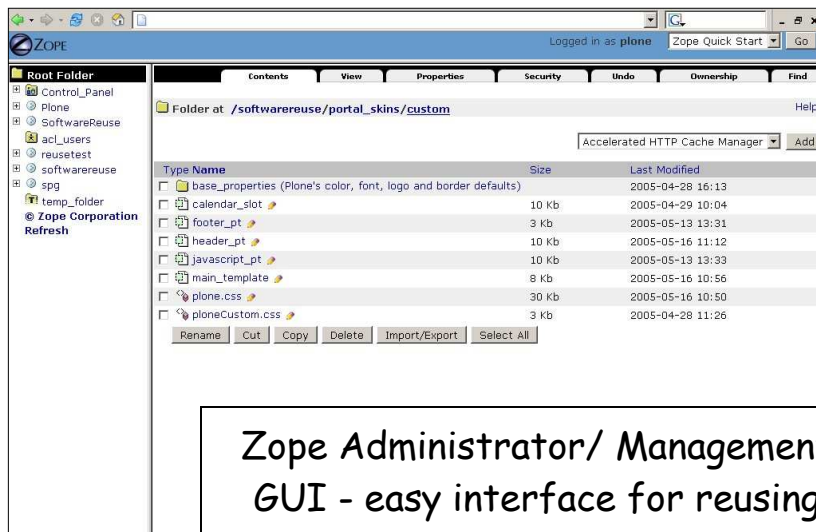
- Software Reuse portal goals:
 - Raise awareness of software reuse within the Earth science community
 - Establish a platform for community members to share/exchange resources with each other
 - Publish reuse information relevant to the community
 - Enable access to reuse resources
 - Serve as an easy starting point to create NASA web sites

The screenshot displays the Earth Science Software Reuse Portal. The top navigation bar includes links for HOME, REUSABLE ASSETS, RESOURCES, OPEN SOURCE, and FUNDING OPPORTUNITIES. The left sidebar lists recent news items such as 'Aerospace 2006 Final Papers Due December 11' and 'GeoInformatics 2006 Abstracts Posted'. The main content area features a 'NEW: Source Code Search Engine' and a welcome message. At the bottom, a diagram illustrates the process of developing an internal marketplace for reusable software development artifacts, showing the flow from Supply to Demand through Marketplace Enablement.

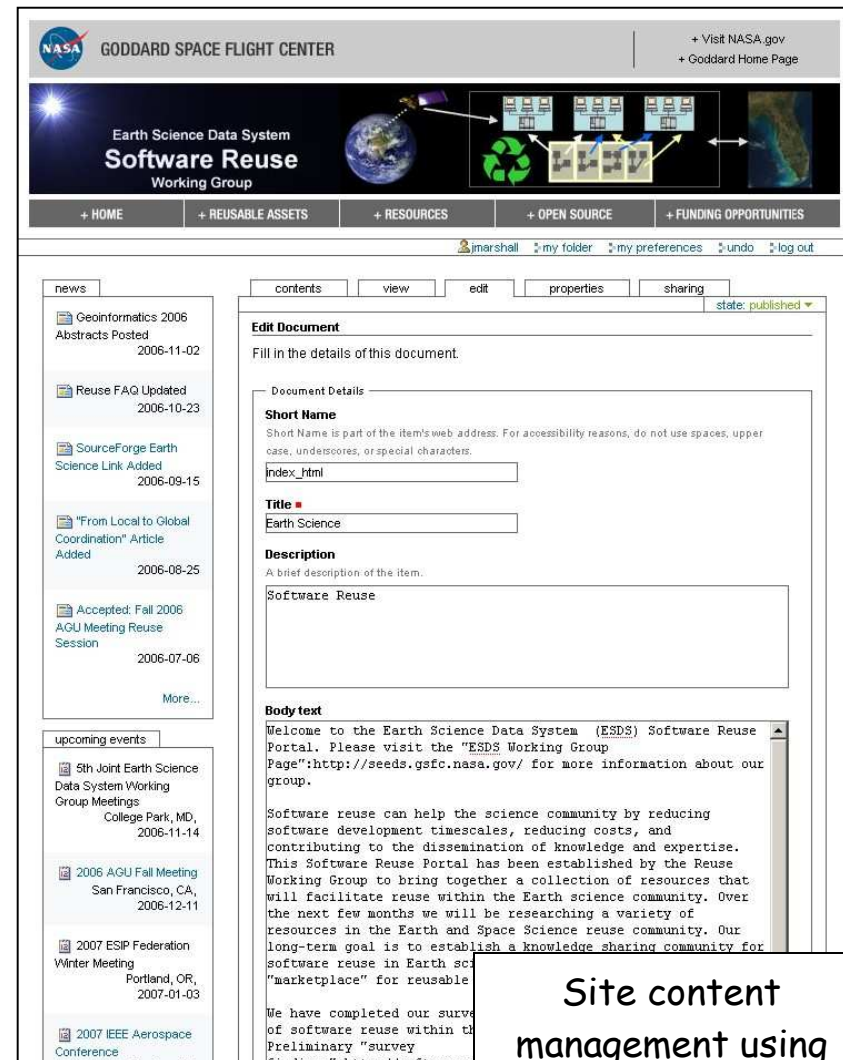


About the Reuse Portal

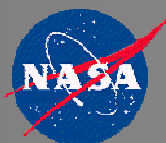
- Uses Plone (with Zope)
 - Open source content management system running on Linux
 - Update content using a simple browser-based interface
- Follows NASA Portal Affinity
 - Consistent NASA look and feel
- NASA server supports Reuse and Tech. Infusion portals on one instance, SPG portal on a second.



Zope Administrator/ Management
GUI - easy interface for reusing
and maintaining portals

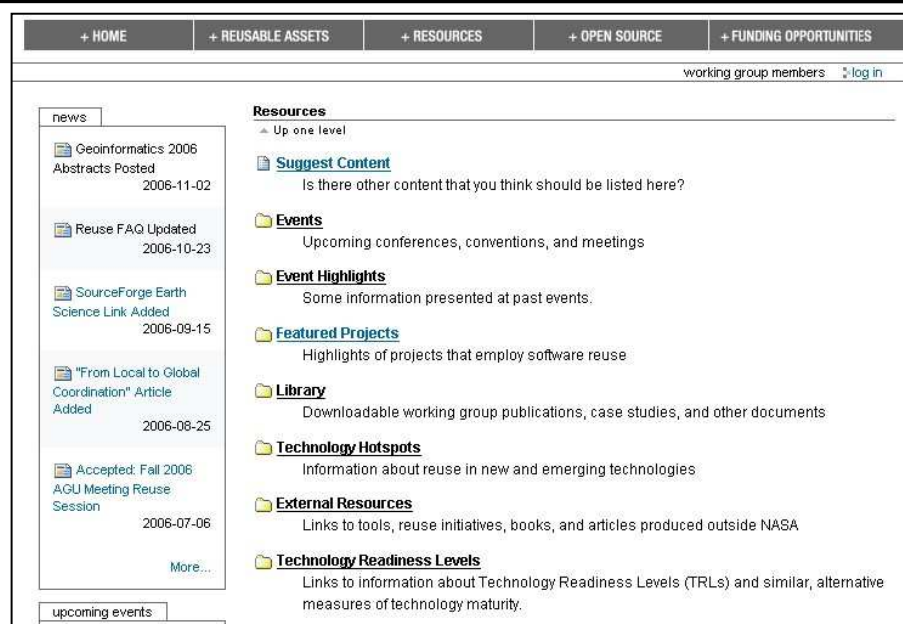


Site content
management using
Plone



Portal Content Status

- Home/News ☒☒☒
 - Latest news and information
 - Upcoming events
 - Source code search (new)
- Reusable Assets ☒☒☒
 - Links to various catalogs (e.g., GCMD, OTT Open Source)
- Open Source ☒☒☐
- Funding Opportunities ☐☐☐
 - Information about funding opportunities for reuse

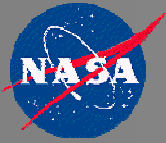


- Resources (overall) ☒☒☐
 - Suggest Content (new) ☒☒☒
 - Events ☒☒☒
 - Event Highlights (new) ☒☐☐
 - Featured Projects ☐☐☐
 - Library ☒☒☐
 - Technology Hotspots ☒☐☐
 - External Resources ☒☒☐
 - TRLs (new) ☒☒☐

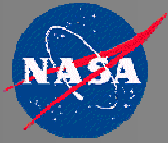
Results for “software reuse” web search

#1 and #2 hits on MSN (main and news pages)

#2 hit on Google

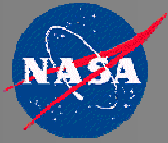


- GCMD
 - How an RES could work with the GCMD
 - Getting a link to the reuse portal on the GCMD
- NASA AMES Open Source
 - Getting a link to the reuse portal on their site
 - Discussing other possible opportunities for collaboration
- ESIP Federation
 - Getting a link to the reuse portal on their web site
 - Will consider other possible opportunities for collaboration

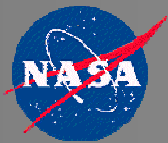


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Trade Study Summary



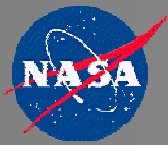
- Enabling Systems Recommendations
 - NASA should establish a system to facilitate the cataloging and distribution of reusable assets for the Earth science community.
- NASA Headquarters tasked the Working Group to look at the roles of the GCMD, Open Source Agreement site, and other sites in serving the community and meeting reuse needs.
 - Ensure that there are no existing systems that already fulfill the role proposed by the reuse working group for a reuse enablement system.



Reuse Enablement System Requirements

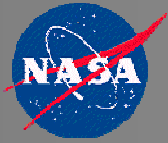
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| <ul style="list-style-type: none">1. Users<ul style="list-style-type: none">1.1. Types<ul style="list-style-type: none">1.1.1. Consumer1.1.2. Provider1.1.3. Administrator1.1.4. Content Manager1.2. Information Storage<ul style="list-style-type: none">1.2.1. User Information1.2.2. Provider Information1.3. Interface<ul style="list-style-type: none">1.3.1. Profile Management1.3.2. Request Account Deletion2. Assets<ul style="list-style-type: none">2.1. Information Storage<ul style="list-style-type: none">2.1.1. Asset Information2.1.1. Asset Resources2.2. Discovery<ul style="list-style-type: none">2.2.1. Alphabetic Listing2.2.2. Search2.2.3. Hierarchical Navigation | <ul style="list-style-type: none">2. Assets (continued)<ul style="list-style-type: none">2.3. Management<ul style="list-style-type: none">2.3.1. Modify Asset2.3.2. Remove/Delete Asset2.3.3. Categorize Asset2.4. Feedback<ul style="list-style-type: none">2.4.1. Collect Feedback2.4.2. Display Feedback2.5. Metrics<ul style="list-style-type: none">2.5.1. Downloads2.5.2. Links2.5.3. Registered Users2.5.4. Rating Summary3. Notifications<ul style="list-style-type: none">3.1. Send Notifications<ul style="list-style-type: none">3.1.1. Asset Events3.1.2. System Events3.2. Notification Management<ul style="list-style-type: none">3.2.1. Add Notifications3.2.2. Remove Notifications | <ul style="list-style-type: none">4. System Operations<ul style="list-style-type: none">4.1. Feedback<ul style="list-style-type: none">4.1.1. Suggestions4.1.2. Administrator Contact4.2. Policy Compliant<ul style="list-style-type: none">4.2.1. Security4.2.2. Policy4.2.3. Technical and Other4.2.4. Policy Availability4.3. Repository and Catalog<ul style="list-style-type: none">4.3.1. Function as Repository4.3.2. Function as Catalog4.3.3. Provider's Choice4.3.4. Repository Storage Limit4.4. Asset Cleanup<ul style="list-style-type: none">4.4.1. Asset Deprecation4.4.2. Asset Removal |
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Formalized Requirements



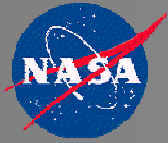
Trade Study Conclusions

- None of the existing sites fulfill the role of a software repository for the Earth science community.
- None of the systems provide the capabilities needed to function as a reuse enablement system.
- Typical shortcomings of existing systems include the following:
 - Not meeting enough of the critical functional requirements
 - Not focusing on the Earth science domain
 - Not targeting software developers as the primary audience
 - Not providing the type of small-sized assets that are most desired by the community of Earth science software developers for reuse purposes
- A new catalog/repository system is needed to encourage and better enable software reuse within the community of Earth science software developers.
- Some collaboration with existing systems may be possible, but existing systems alone cannot meet the needs of this community.



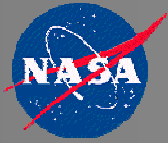
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Bottom-Up Reuse



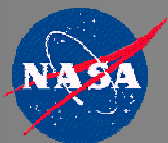
Bottom-Up Reuse

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- Issue of bottom-up reuse was raised earlier this year.
 - Reuse from the developer's perspective rather than the organization's perspective.
 - Held a brainstorming session on the subject at the September monthly telecon.
 - Created a list of topics within bottom-up reuse at the October monthly telecon.
 - Asked all Reuse WG members attending this meeting to prepare short presentations on one topic.
 - Discussions following presentations will be used to generate guidelines for the portal web site.



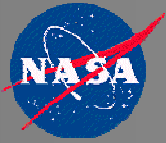
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Reuse Breakout Sessions



Meeting Agenda

Tuesday 14-Nov		Wednesday 15-Nov		Thursday 16-Nov	
07:30 AM	Registration and breakfast				
08:30 AM	Welcome, logistics, Opening Remarks	08:30 AM	Joint WG Meeting	08:30 AM	Plenary speaker
09:30 AM	Opening Remarks				
10:00 AM	Break	10:00 AM	Break	10:00 AM	Break
10:30 AM	Working Group Summaries	10:30 AM	Reuse breakout	10:30 AM	Reuse breakout: Planning, report back prep.
				11:30 AM	Closing Remarks
12:00 PM	Lunch with speaker				
01:30 PM	Reuse breakout: survey and evaluate prototype sites for reuse enablement system	01:30 PM	Poster and Demonstration session		
03:30 PM	Break	3:30 PM	Break		
04:00 PM	Bottom-Up Reuse	04:00 PM	Demos		
05:00 PM		05:00 PM			



Reuse Breakout Agenda

- Day 1
 - Introduction/Summary (Robert / Vic)
 - Reuse enablement system prototype evaluation (Jim / Angelo)
 - Speaker: Bradford Castalia, University of Arizona
 - Bottom-up reuse presentations and discussions (All)
- Day 2
 - Bottom-up reuse presentations, continued (All)
 - Speaker: Jonathan Wilmot, GSFC Flight Software Branch
 - Reuse portal demonstration (Ryan)
 - Reuse portal can be used to create NASA affinity web sites
 - Reuse portal sample catalog with search engine
 - Software catalog/repository demonstration (Bob, Jim, Ryan, Angelo, etc.)
 - Posters
 - Reuse of the Software Reuse Portal (packaging it for reuse by others)
 - The Software Reuse Portal Web Site (including web statistics)